AFTAC -TR-98-014

RADIONUCLIDE

SITE SURVEY

REPORT

MELBOURNE, FLORIDA

(RN-72)

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16 November 1998

Prepared for:
Provisional Technical Secretariat
Comprehensive Nuclear Test-Ban Treaty Organization

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	16 November 1998	Technical (Final)

4. TITLE AND SUBTITLE
Radionuclide Site Survey Report
Melbourne, Florida (RN-72)

5. FUNDING NUMBERS

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
HQ Air Force Technical Applications Center (HQ/AFTAC/TM
1030 S. Highway A1A
Patrick AFB, Florida 32925-3002

8. PERFORMING ORGANIZATION REPORT NUMBER
AFTAC-TR-98-014

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION AVAILABILITY STATEMENT
Approved for public release, distribution is unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The format and content of this report are based on guidance provided by the Preparatory Commission for the CTBT Organization for conducting and documenting radionuclide site surveys (see CTBT/PC/IV/WGB/1) "Requirements of Site Surveys for Radionuclide Stations," (30 September 1997).

The purpose of this report is to validate that the Melbourne site will fulfill the requirements for treaty compliance.

14. SUBJECT TERMS
Radionuclide Site Survey Report, Melbourne, Florida (RN-72)

15. NUMBER OF PAGES
53

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UL

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RADIONUCLIDE SITE SURVEY REPORT

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INTRODUCTION

Melbourne, Florida, USA, is listed in the Comprehensive Nuclear Test-Ban Treaty (CTBT) as the location for an International Monitoring System (IMS) radionuclide detection system. This site is located on Patrick Air Force Base in Brevard County, Florida. The purpose of this report is to validate that the Melbourne site will fulfill the requirements for treaty compliance.

SITE SURVEY GUIDANCE

The format and content of this report are based on guidance provided by the Preparatory Commission for the CTBT Organization for conducting and documenting radionuclide site surveys (see CTBT/PC/IV/WGB/1, "Requirements of Site Surveys for Radionuclide Stations," 30 September 1997).

1. General Information

a. Treaty Location: 28.23°N/80.60°W
b. Proposed Location: 28°13′53″N/80° 36′09″W
c. Altitude: The equipment is located 16 meters above Mean Sea Level (MSL).
d. Locality: Patrick Air Force Base, Melbourne, Brevard County
e. Province: Florida
f. Airports: There is one military and two commercial airfields near the site, as shown in Table 1.

Table 1: Local Airports

AIRPORT	DISTANCE FROM SITE	DIRECTION FROM SITE
Patrick AFB	1 km	west
Melbourne International	19 km	south
Orlando International	72 km	west

g. Seaports: There is a deep water port at Port Canaveral, 11 km north of the site.
h. Rail Station: There is access to a rail freight line, 21 km northwest of the site.
i. Local Access: There is access to a four lane state highway (A1A) adjacent to the site, with four lane highway connections to the national interstate highway system within 20 km to the west.
j. Best and most cost-effective way for transporting heavy equipment: The best option for transporting heavy equipment is by commercial highway carrier.

k. Best and most cost effective way for people to access the station location: Air travel is the most cost-effective means of transportation from long distance; auto transportation is a second option if time/distance are not critical factors.
l. Description: The site is located on level, open land that is predominantly coastal plain. The equipment is housed on the fifth floor of the Air Force Technical Applications Center (AFTAC).
m. Type of terrain: Coastal plain
n. Located in valley/depression: The site is not located in a valley or depression.
o. Grade: N/A
p. Person in charge of the site survey:

(1) Name: John Lucas
(2) Organization: AFTAC
(3) Address: 1030 S. Highway A1A, Patrick AFB, FL 32925-3002
(4) Phone: (407) 494-7594
(5) Fax: (407) 494-5460
(6) Email: johnl@aftac.gov

2. Narrative Site Description

The site is located on Patrick Air Force Base on the fifth floor of the AFTAC facility. The facility is owned by the United States government. The site sits on level, open land and is above any obstruction in the area.

The prevailing winds are from the southeast for most of the year. The climate is generally hot and humid from late spring through early fall, and moderate the remainder of the year. The current site is climate controlled and has adequate power and telephone capabilities.

3. Available buildings and land for hosting the radionuclide station

The equipment is housed in a United States government-owned building on government-owned land. A suitable power supply is already available on site.

4. Operational Information

a. Responsible Agency: AFTAC
b. Address: 1030 S. Highway AIA, Patrick AFB, FL 32925-3002
c. Technical contact:

(1) Name: John Lucas
(2) Address: AFTAC, 1030 S. Highway A1A, Patrick AFB, FL 32925-3002
(3) Phone: (407) 494-7594
(4) Fax: (407) 494-5460
(5) Email: johnl@aftac.gov

d. Is the site shared with other organizations or used for additional purposes? No, the room in which the air sampler is located is not used by any other organization or for any other purpose.

e. Spare part availability:

(1) Spares at site: No spares are located at the site.

(2) Time to replace parts: The replacement of defective parts is estimated to take less than 24 hours.

5. Existing station infrastructure (manufacturer of each component)

This is a new station. No prior infrastructure existed prior to the site survey and subsequent equipment installation.

6. Preferences for upgrading or installing a new station

a. Automatic or manual operated station? The proposed station will have automatic operation.

b. Install what type of system?

(1) Air sampler: The proposed system is a Radionuclide Aerosol Sampler/Analyzer (RASA) manufactured by DME Corporation of Orlando, Florida.

(2) Measuring system:

(a) Detector: The detector is a high purity germanium detector.

(b) Electronic: The electronics are a DSPEC spectrometer manufactured by EG&G.

(c) Software: The software is US government provided software.

c. Preferences or needs concerning the housing of the station: There are no other needs concerning the housing of the station.

d. Other preferences: N/A

7. Meteorological Information

a. General climate description:

From mid-May to late September, fair weather cumulus may form a ceiling from 1000-1300L. Easterly waves occur 6-8 times a month bringing short-lived ceilings. Thunderstorms occur, on average, sixty-nine days a year, fifty-six of these are between May and October. These may be caused either from easterly waves or from afternoon instability.

From late November to mid-March, frontal activity is the primary cause of ceilings. Ceilings are generally present from 2-4 hours preceding a front and for 1-3 hours after frontal passage. Ceilings are continuous with stationary fronts. Transitional periods between fronts will show both a mixture of frontal activity and summer afternoon convective activity.

The sea breeze averages 8 knots with gusts to 13 knots. Land breezes are weaker. Winds greater than twenty knots are attributed to gusts from thunderstorms and strong cold fronts. Tropical storms and hurricanes account for maximum wind gusts. The hurricane season is from June through November, with an increase in activity from August through the end of the season.

b. Average annual rainfall (cm): The average annual rainfall is 113 cm.

c. Maximum rain precipitation per 24 hours (cm): The maximum rain precipitation per 24 hours was 19.3 cm and was recorded in October.

d. Snowfall (when and cm): Snowfall is rare and occurs only in trace amounts with January as the most probable month.

e. Prevailing wind direction: The prevailing wind direction is east southeast.

f. Maximum wind speed: Maximum wind speed is 84 knots and is usually associated with hurricanes.

g. Min/max temperature and annual average temperature/Centigrade (C): The lowest temperature recorded is -4° C and occurred in January. The maximum recorded temperature of 37°C occurred during June, July, and August. The annual average temperature is 24° C.

h. Nearby large bodies of water: The Atlantic Ocean is located 0.2 km to the east. The Indian and Banana Rivers are located 0.5 km to the west. These "salt water rivers" are actually ocean inlets that are part of the Intracoastal Waterway. They are bounded on both sides by land masses, giving the appearance of a river.

i. Nearby mountain ranges: There are no mountain ranges within the state.

j. Nearby population centers: There are numerous small cities and towns located within 50 km of the site. The largest city in the county is Palm Bay, with a population of approximately 70,000 residents.

k. Industrial pollution: The industrial pollution is indexed as 75 out of 500 on the Environmental Protection Agency Pollution Standards Index (PSI). A level at or below 100 indicates that a pollutant reading is in the satisfactory range. The pollutants indexed by the PSI are called "criteria pollutants." They are pollutants for which science-based health criteria are used to determine the allowable ambient (outdoor) air concentrations. The EPA regulates the criteria pollutants because of their impact on human health and the environment. They are:

Carbon monoxide (CO)
Ground-level ozone (O_3)
Lead (Pb)
Nitrogen dioxide (NO_2)
Particulate matter (PM_{10})
Sulfur dioxide (SO_2)

The standards or allowable concentrations for these six pollutants are known as National Ambient Air Quality Standards (NAAQS).

The main measured pollutants were ground-level ozone and particulate matter.

l. Nearby weather station: The nearest weather station is located 0.6 km south on Patrick Air Force Base.

m. Person or institution that provided meteorological report:

Name: Ssgt Jason Macartney, Staff Meteorologist
AFTAC/TMSW
(some data provided by AFCCC)
Address: 1030 S. Highway A1A, Patrick AFB, FL 32925-3002
Phone: (407) 494-7933
Fax: (407) 494-5450

n. Date of this report: July 15, 1998

o. Description of local microclimate situation: The local microclimate conditions are sea breezes.

p. Recency of above data: The reports used hourly weather observations from January 1985 - December 1994 and also used the End of Day Summary Data from February 1950 - December 1994.

8. Safety

a. Natural hazards: The natural hazards in Table 2 reflect the associated risk level to the station (risk level: non-existent, very low, medium, high, very high).

Table 2: Natural Hazards

Hazard	Risk level	Hazard	Risk level
Hurricane	Medium	Landslide	Very low
Tornado	Medium	Volcanic activity	Non-existent
Tsunami	Very low	Animals	Very low
Flood	Medium	Other	None
Earthquake	Non-existent		

b. Description and possible countermeasures:

(1) Potential safety issues on human activities in the surrounding areas: The radionuclide sampling equipment is located in a limited-access, secure facility.

(2) **Potential terrain issues:** Flooding of the lower floors of the facility and damage as a result of high winds are concerns during hurricanes. Sandbagging of entrances and installation of plywood over large glass areas, as well as covering electronic components minimize the risk. The sampler is located on the fifth floor of the building.

9. Environmental issues (waste, noise regulations, etc.)

There are no other environmental issues.

10. Radiological information

a. Average and seasonal range of Pb-212 airborne concentration (μBq./m³): The average Pb-212 concentration was 5352.1 μBq./m³. Insufficient data exists to provide seasonal range information. The average readings were based on daily measurements for the month of August 1998 as shown in Tables 5 and 6.

b. Average and seasonal range of Be-7 airborne concentration (μBq./m³): The average Be-7 concentration was 2020.1 μBq./m³. Insufficient data exists to provide seasonal range information. The average readings were based on daily measurements for the month of August 1998 as shown in Tables 7 and 8.

c. Average and seasonal range of Cs-137 airborne concentration (μBq./m³): No Cs-137 data was available.

d. Average and seasonal range of Pb-210 airborne concentration (μBq./m³): No Pb-210 data was available.

e. Other natural and/or anthropogenic radionuclides: No other isotope was available.

f. Nearby nuclear power plants: The nuclear power plants listed in Table 3 are the plants located within 350 kilometers of the site.

Table 3: Nuclear Power Plants

Plant name	Type of reactor	Distance from site	Direction from site
St. Lucie	Pressurized Water Reactor (PWR)	128 km	south southeast
Crystal River	Pressurized Water Reactor (PWR)	240 km	northwest
Turkey Creek	Pressurized Water Reactor (PWR)	327 km	south southeast

g. Nearby plants where radioisotopes are used or produced:
The nearest research facility with a nuclear reactor is located at the University of Florida in Gainesville, Florida. The reactor is a 100kw Argonaut reactor with a neutron activation analysis lab. The reactor is located 233 km from the Melbourne site.

Sun Nuclear Power Corporation operates an instrument calibration laboratory 16 km southwest of the site. The primary isotope used is cesium.

There are five local hospitals within 50 km of the site that have nuclear medical facilities. Table 4 shows the facilities and the distance/direction from the site.

Table 4: Local Hospitals with Nuclear Medicine Departments

Hospital	Distance from Site	Direction from Site
Parrish Community	42 km	north
Holmes Regional	29 km	south
Cape Canaveral	8 km	north
Palm Bay Community	38 km	south
Wuesthoff	20 km	west

h. Constant and episodic anthropogenic sources of radionuclides: Trace levels of iodine were detected on one occasion in December, 1998. The most likely source was from a local hospital.

i. Other potential man-made radioactive sources: In addition, there are numerous medical resonance imaging and cancer oncology facilities within a 50 km radius,

possibly producing detectable radionuclides (iodine, radium, technetium, barium, and thallium).
Another possible radioactive source is from the reactors of attack and ballistic missile submarines that transit the basin at Port Canaveral, 7 km to the north. The last possible source is from the launch complex at Cape Canaveral Air Station where occasional payloads may contain radioactive material.
j. Elevated natural radiation sources: There were no other elevated natural radiation sources.
k. Other: Not applicable.
l. Recency of above data: October 2, 1998

11. Schedule and measurements (techniques, measurement protocols, and results)

a. Period of the on-site survey: The survey was conducted between August 1 - 31, 1998.
b. Dose rate measurements: Not applicable.
c. In-situ gamma spectrometry: Not applicable.
d. Aerosol filter measurement: The two isotopes measured during air filter measurement were Pb-212 and Be-7. Figures 1 and 2 and Tables 5, 6, 7, and 8 define daily measurements and summaries of concentration measurements.

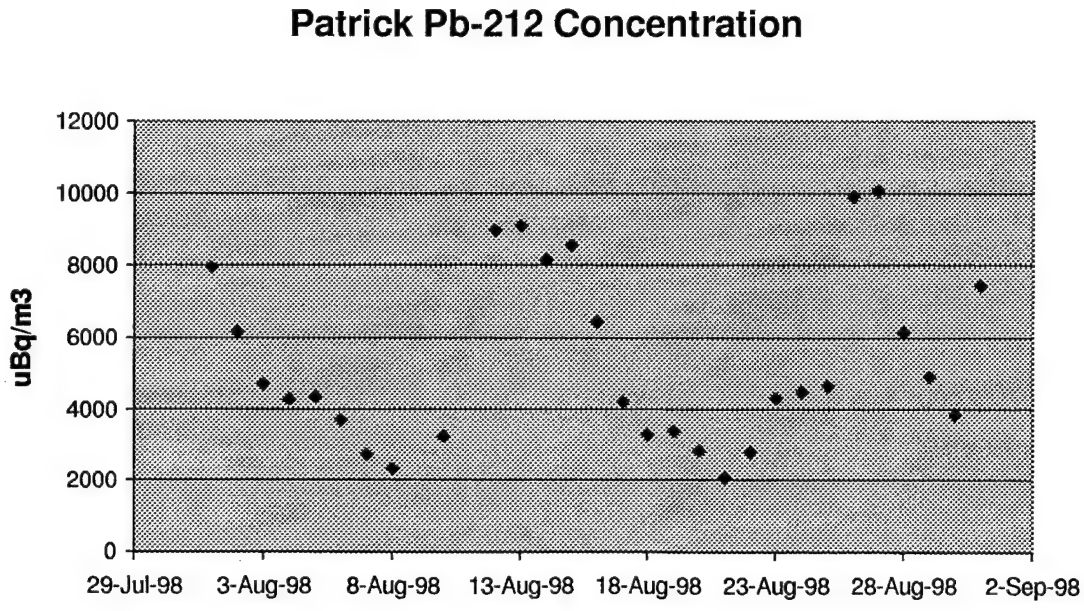


Figure 1: Pb-212 Concentration

Table 5: Pb-212 Daily Measurements

Stop Day	Pb-212 Conc ($\mu Bq.m^3$)	%Error	Stop Day	Pb-212 Conc ($\mu Bq.m^3$)	%Error	Stop Day	Pb-212 Conc ($\mu Bq.m^3$)	% Error
1 Aug 98	7956.17	8.43%	13 Aug 98	9105.59	8.38%	23 Aug 98	4312.12	8.76%
2 Aug 98	6165.51	8.47%	14 Aug 98	8164.57	8.41%	24 Aug 98	4483.85	8.84%
3 Aug 98	4719.11	8.58%	15 Aug 98	8572.19	8.43%	25 Aug 98	4644.99	8.83%
4 Aug 98	4277.09	8.62%	16 Aug 98	6438.47	8.73%	26 Aug 98	9924.49	8.27%
5 Aug 98	4368.02	8.61%	17 Aug 98	4222.91	8.75%	27 Aug 98	10088.55	8.48%
6 Aug 98	3711.45	8.73%	18 Aug 98	3289.10	8.93%	28 Aug 98	6151.66	8.74%
7 Aug 98	2708.15	9.00%	19 Aug 98	3393.28	8.90%	29 Aug 98	4925.52	8.77%
8 Aug 98	2319.89	9.04%	20 Aug 98	2841.66	9.02%	30 Aug 98	3858.91	9.08%
10 Aug 98	3253.29	8.81%	21 Aug 98	2081.03	9.41%	31 Aug 98	7454.85	8.53%
12 Aug 98	8982.22	8.41%	22 Aug 98	2795.39	8.96%			

Table 6: Pb-212 Concentration Measurement Summary

Maximum Concentrations	10088.5
Minimum Concentrations	2081.0
Average Concentrations	5352.1
Standard Deviation	2435.1

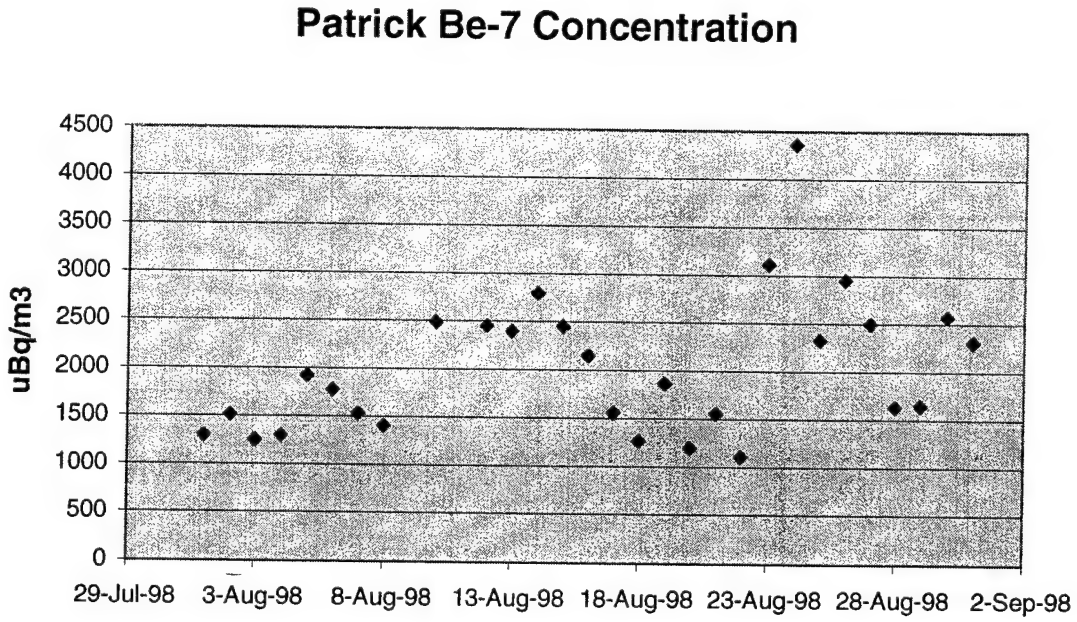


Figure 2: Be-7 Concentration

Table 7: Be-7 Daily Measurements

Stop Day	Be-7 Conc ($\mu Bq.m^3$)	%Error	Stop Day	Be-7 Conc ($\mu Bq.m^3$)	%Error	Stop Day	Be-7 Conc ($\mu Bq.m^3$)	% Error
1 Aug 98	1296.17	3.74%	13 Aug 98	2393.40	3.48%	23 Aug 98	3111.30	3.42%
2 Aug 98	1509.35	3.62%	14 Aug 98	2786.85	3.44%	24 Aug 98	4351.32	3.37%
3 Aug 98	1245.38	3.73%	15 Aug 98	2445.08	3.47%	25 Aug 98	2323.05	3.52%
4 Aug 98	1291.74	3.69%	16 Aug 98	2148.49	3.52%	26 Aug 98	2951.39	3.45%
5 Aug 98	1917.71	3.53%	17 Aug 98	1556.31	3.65%	27 Aug 98	2496.87	3.49%
6 Aug 98	1773.74	3.55%	18 Aug 98	1263.80	3.73%	28 Aug 98	1628.57	3.67%
7 Aug 98	1528.67	3.63%	19 Aug 98	1864.59	3.55%	29 Aug 98	1645.00	3.66%
8 Aug 98	1402.03	9.04%	20 Aug 98	1195.91	3.79%	30 Aug 98	2568.87	3.48%
10 Aug 98	2480.90	3.47%	21 Aug 98	1553.32	3.64%	31 Aug 98	2303.10	3.52%
12 Aug 98	2446.90	3.48%	22 Aug 98	1102.04	3.82%			

Table 8: Be-7 Concentration Measurements Summary

Maximum Concentrations	4351.3
Minimum Concentration	1102.0
Average Concentrations	2020.1
Standard Deviation	731.1

e. Soil/rock samples: The isotopes found during soil sampling and their concentrations are depicted in Tables 9 and 10 and in Figure 3.

Table 9: Soil Sample Measurements

Sample	1		2		3		4		5		6	
Isotope	Conc. (mBq/ gm)	% Error	Conc. (mBq/g m)	% Error	Conc. (mBq/ gm)	% Error	Conc. (mBq/g m)	% Error	Conc. (mBq/g m)	% Error	Conc. (mBq/g m)	% Error
Be-7									51.31	31.7	36.09	36.1
K-40	63.33	116.0			182.06	36.4	97.27	73.4	34.43	193.2	89.93	92.1
Cs-137					18.20	14.2	19.96	15.0			15.21	23.2
Bi-211	73.02	40.8	81.6	30.6	136.34	21.9	82.59	32.9	112.03	21.2	145.67	22.7
Bi-212			41.97	35.8					27.59	36.5		
Pb-212			30.18	12.3	27.25	13.2	22.66	19.9	31.60	11.4	39.18	12.7
Bi-214			54.26	12.3	143.68	5.8	38.04	18.4	59.86	10.8	107.75	8.7
Pb-214	37.68	23.6	54.92	11.5	122.26	6.2	20.49	38.9	48.74	13.5	73.86	12.1
Ra-224			395.58	33.4	314.51	54.4			207.71	71.1	391.91	51.8
Ra-226					73.37	232.7						
Ac-228	41.10	16.7	51.08	12.9	31.84	26.1	41.35	15.9	69.22	9.4	46.23	24.0
Th-228	115.17	99.8			111.25	80.2	118.69	97.0				
Th-231					16.11	101.7	18.98	94.8				
Pa-234M					561.65	49.6						
Th-234	108.71	59.1	69.41	64.7	205.15	22.1	139.43	45.2	142.93	32.8	78.23	66.9
U-235	8.75	45.6	3.58	84.6	13.59	74.1	2.70	136.0	6.16	49.9	17.52	22.0

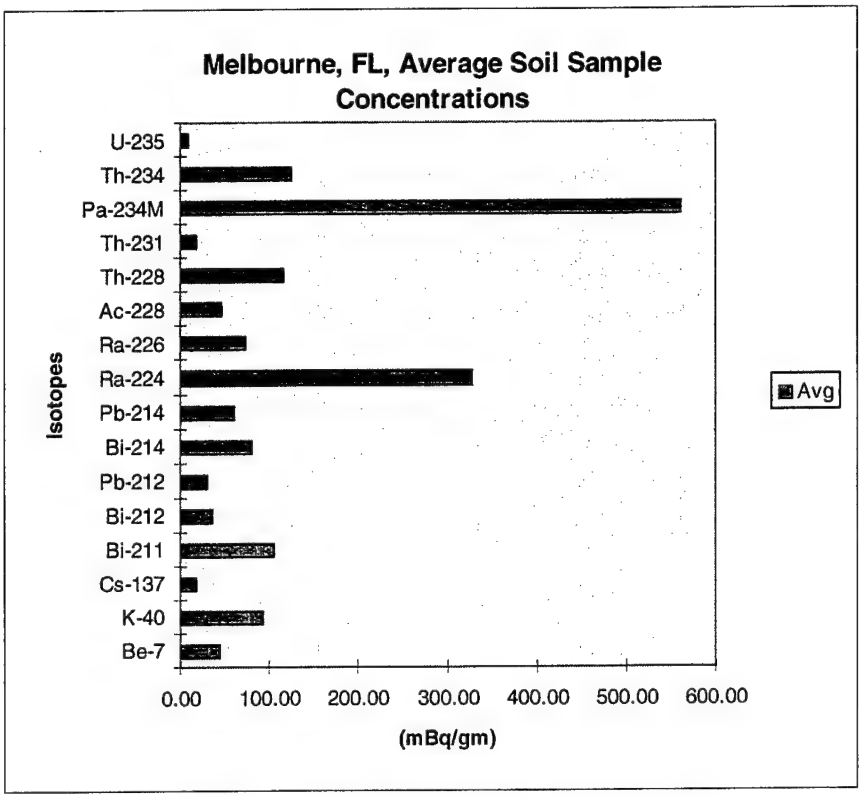


Figure 3: Average Soil Sample Concentrations

Table 10: Average Soil Sample Concentration Summary

Isotope	Average Concentration (mBq/gm)	Standard Deviation	% Standard Deviation
Be-7	43.70	10.8	24.6%
K-40	93.4	55.4	59.3%
Cs-137	17.79	2.4	13.5%
Bi-211	105.21	30.8	29.3%
Bi-212	34.78	10.2	29.2%
Pb-212	30.17	6.1	20.2%
Bi-214	80.72	43.7	54.2%
Pb-214	59.66	35.4	59.4%
Ra-224	327.43	88.1	26.9%
Ra-226	73.37	N/A	N/A
Ac-228	46.80	12.7	27.1%
Th-228	115.04	3.7	3.2%
Th-231	17.54	2.0	11.6%
Pa-234M	561.65	N/A	N/A
Th-234	123.98	50.0	40.3%
U-235	8.72	5.8	67.0%

12. Observations, reasoning, discussion, and recommendations

a. Air flow decoupling at site: Air flow decoupling rarely occurs at the site. See Annex D for detailed decoupling data.
b. Microclimate conditions at site: The microclimate conditions at the site are sea breezes.
c. Infrastructure (existing/needed): The current building infrastructure has been upgraded with power and communications and currently meets IMS requirements.
d. Background radioactivity (natural/anthropogenic): All known natural and anthropogenic radionuclide sources have been identified and are not considered significant.
e. Communications (proposed locations of VSAT antenna, host country communication regulations, etc.): The proposed method of communications is by commercial phone lines.
f. Final evaluation: This location should fulfill all of the requirements of the CTBT.

Annex A: Local and General Siting Maps of Melbourne, Florida

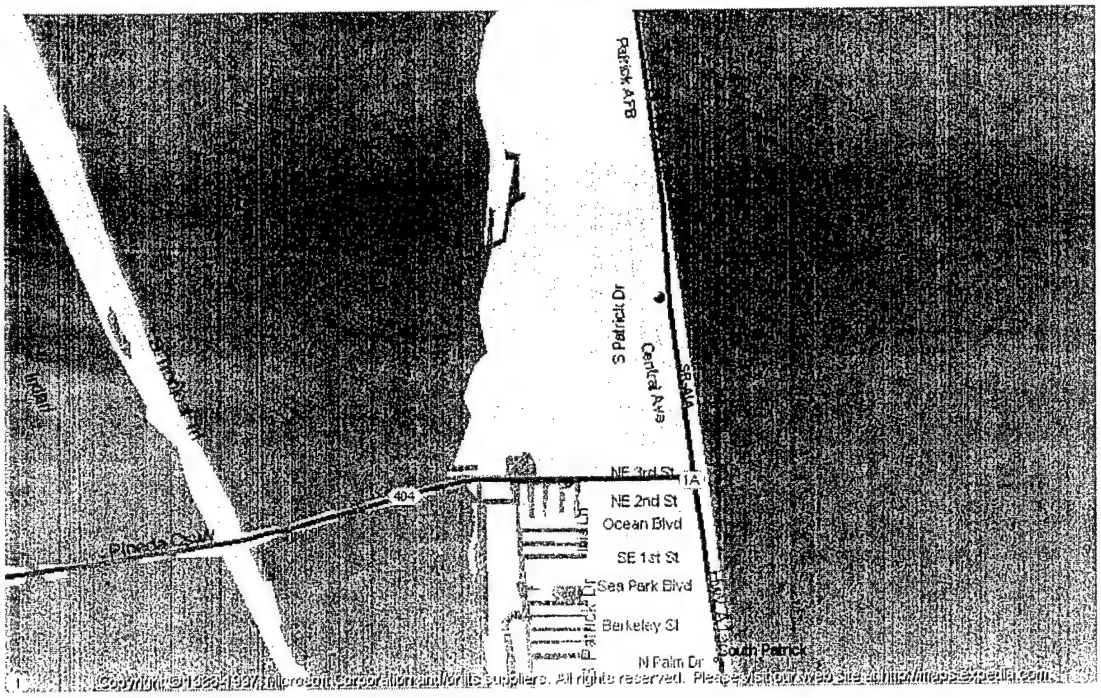


Figure A-1: Site Map

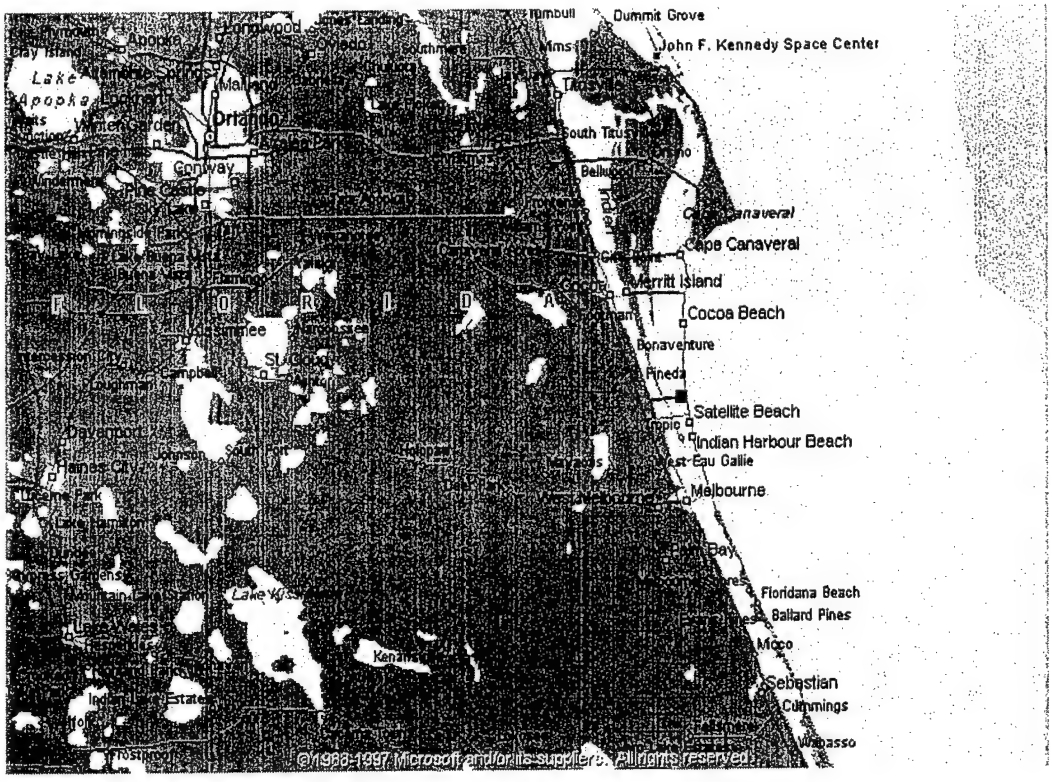


Figure A-2: Local Area Map

Annex B: Site Photographs

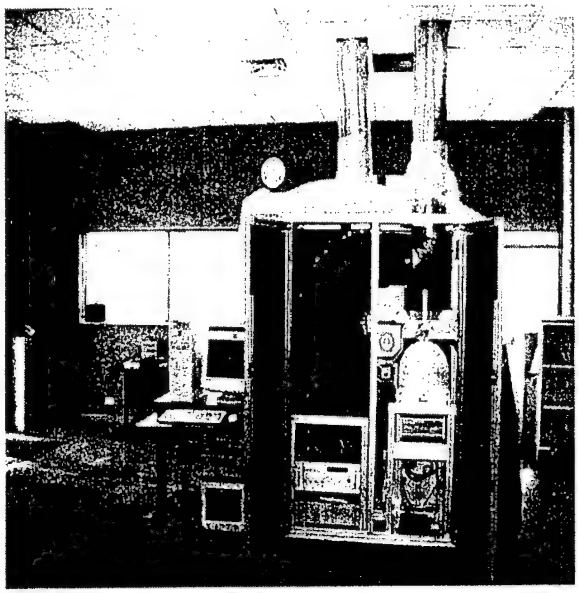


Figure B-1: View of Sampler in room

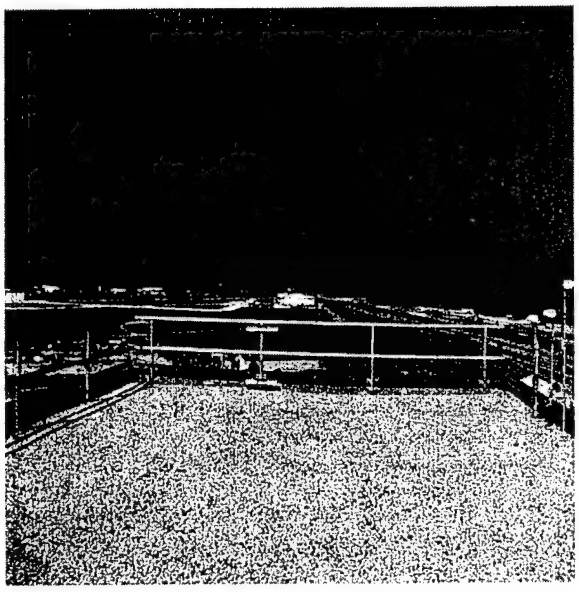


Figure B-2: View from Site to North

Annex B: Site Photographs (continued)

Figure B-3: View from Site to East

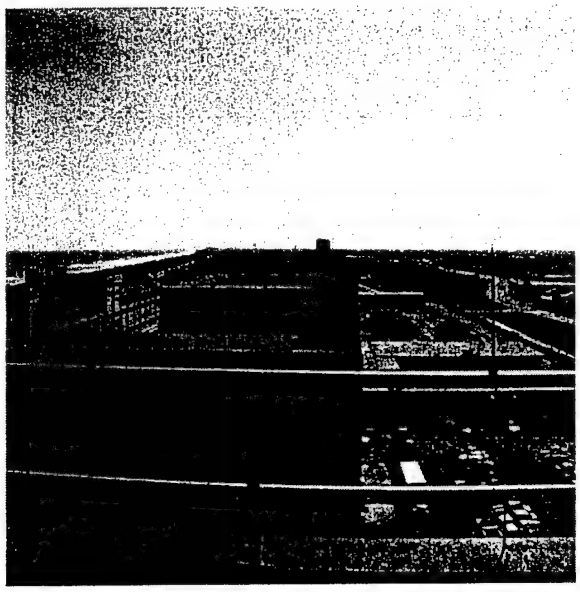


Figure B-4: View from Site to South

AnnexB: Site Photographs (continued)

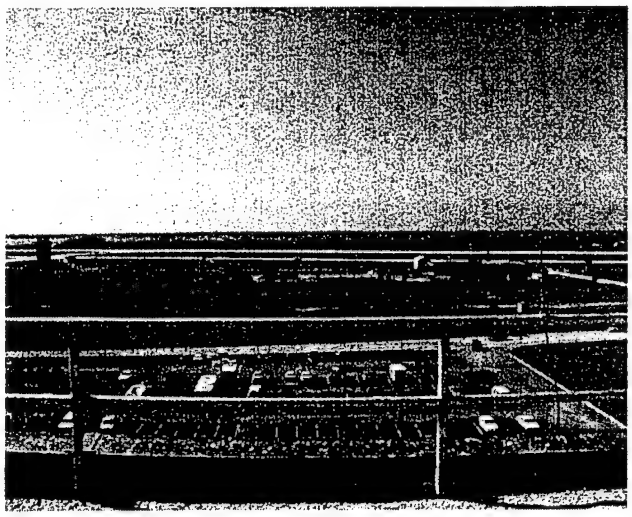


Figure B-5: View from Site to West

Annex C: Annual Meteorological Graphs

Yearly graphs of wind speed, temperature and precipitation

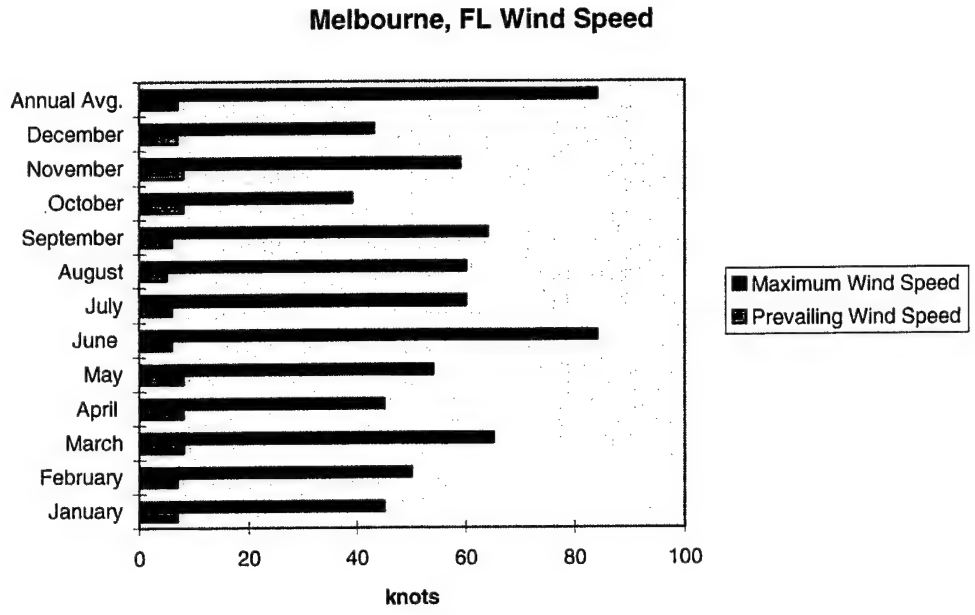


Figure C-1: Annual Wind Speed Graph

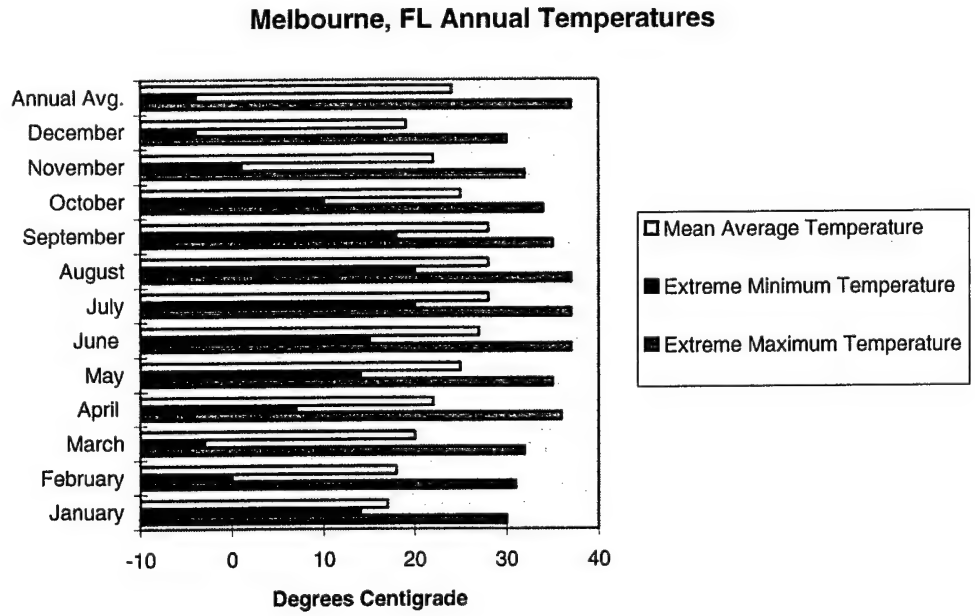


Figure C-2: Annual Temperature Graph

Annex C: Annual Meteorological Graphs (continued)

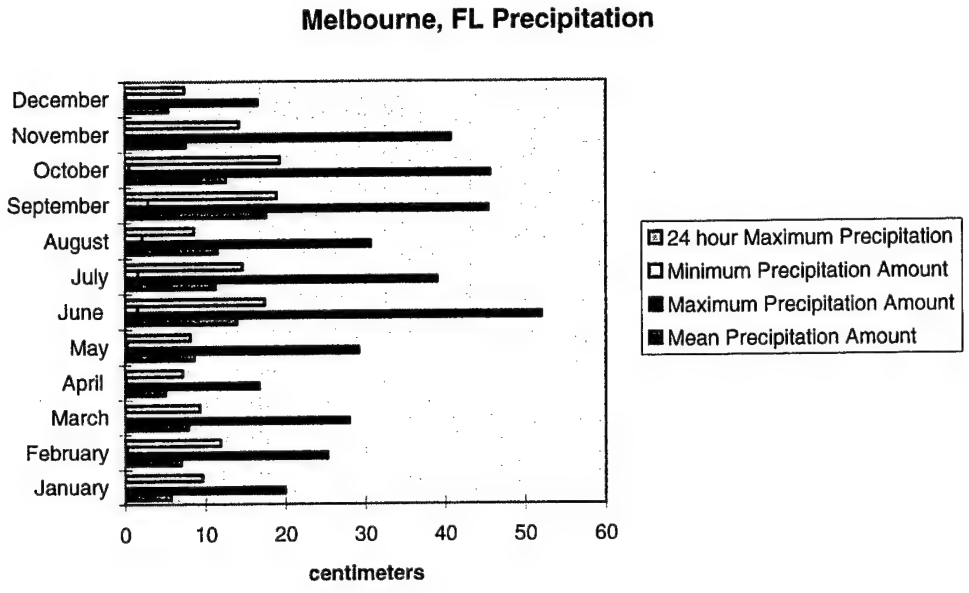


Figure C-3: Annual Precipitation Graph

Annex D: Decoupling Report

Meteorological data/report that attests that the site survey area is not decoupled from upper airflow for a period greater than 24 hours.

The average decoupling estimate is based on the climatological record of the Pasquill-Gifford stability classes for the site, where D is neutral, A is very unstable and G is very stable. To estimate the site decoupling, the percentage of time the site experienced Pasquill-Gifford stability classes of F and G was summed. These are defined as stable conditions for F and extremely stable for G. The underlying assumption is that decoupling will only occur when the atmosphere is stable. These two stability classes can only occur at night, with wind speeds less than 3 meters/second, and less than half the sky can have clouds. This data is based on hourly surface observations taken at each station.

The F and G conditions generally do not last more than 2-3 hours during a specific day at Patrick AFB (see Table D-1). Therefore, the Patrick AFB sampling site is not decoupled from the upper atmosphere for periods exceeding 24 hours.

Period of Record: 1950 - 1996
# of Observations: 375,441
Source: Patrick Met Office

% Frequency of Occurrence
Stability Indices for Patrick AFB, FL

Table D-1: Decoupling Frequency of Occurrence

Stability Index	% Freq of Occurrence	# of Observations	Stability Index	% Freq of Occurrence	# of Observations
Jan F&G	16.04%	5059	Jul F&G	17.28%	7138
Feb F&G	13.79%	4095	Aug F&G	19.94%	6341
Mar F&G	11.16%	3616	Sep F&G	14.30%	4402
Apr F&G	11.28%	3413	Oct F&G	12.38%	3863
May F&G	10.88%	3447	Nov F&G	14.70%	4476
Jun F&G	11.79%	3715	Dec F&G	15.90%	4928

Annex E: Local Weather Conditions

Meteorological report by experts on local weather conditions (local airflow)

Ten Year Meteorological Report
(Jan 85- Dec 94)

Table E-1: Meteorological Data Summary of Local Conditions

	Mn Max Tmp	Mn Min Tmp	Mn Avg Tmp	Ext Max Tmp	Ext Min Tmp	Mn Pcn Amt	Max Pcn Amt	Min Pcn Amt	24hr Max Pcn	Prv Wnd Dir	Prv Wnd Spd	Max Wnd Gust	Mn Snw Fall	Max Snw Fall	24hr Max Snw Fall
Jan	21	13	17	30	-4	5.68	19.9	T	9.6	N	7	45	T	T	T
Feb	21	14	18	31	0	7.01	25.2	.230	11.9	N	7	50	0	0	0
Mar	24	16	20	32	-3	7.87	27.9	.003	9.25	SE	8	65	0	0	0
Apr	26	19	22	36	7	5.03	16.7	.130	7.16	ESE	8	45	0	0	0
May	28	22	25	35	14	8.60	29.1	.200	8.13	E	8	54	0	0	0
Jun	30	24	27	37	15	13.9	52.0	1.50	17.4	ESE	6	84	0	0	0
Jul	31	25	28	37	20	11.2	39.0	1.60	14.6	ESE	6	60	0	0	0
Aug	31	25	28	37	20	11.5	30.6	2.18	8.6	ESE	5	60	0	0	0
Sep	30	25	28	35	18	17.5	45.4	2.82	18.9	NE	6	64	0	0	0
Oct	28	22	25	34	10	12.5	45.6	.530	19.3	NE	8	39	0	0	0
Nov	25	19	22	32	1	7.5	40.7	.008	14.2	N	8	59	0	0	0
Dec	22	15	19	30	-4	5.4	16.5	.180	7.4	NW	7	43	0	0	0
Ann	26	20	24	37	-4	113	186	74.7	19.3	ESE	7	84	T	T	T

Data listed in Table E-1 are measured in degrees Centigrade, centimeters of precipitation, and knots of wind speed.

Annex F: Experimental Air Sampler Raw Data

Table F-1: Aerosol Sample Collection/Measurement Information

Collect Start	Collect Stop	Acq. Start	Live Time (sec)	Volume (m^3)	Spectrum File
31-Jul-98 16:07:23	01-Aug-98 17:08:01	02-Aug-98 17:08:43	86255	22321	98_aug_04/us005-ca1_2138.s
01-Aug-98 17:08:01	02-Aug-98 17:08:43	03-Aug-98 17:08:03	86272	23000	98_aug_05/us005-ca1_2165.s
02-Aug-98 17:08:43	03-Aug-98 17:08:03	04-Aug-98 17:08:43	86273	21852	98_aug_06/us005-ca1_2181.s
03-Aug-98 17:08:03	04-Aug-98 17:08:43	05-Aug-98 17:08:18	86264	22845	98_aug_07/us005-ca1_2195.s
04-Aug-98 17:08:43	05-Aug-98 17:08:18	06-Aug-98 17:08:02	86244	22860	98_aug_10/us005-ca1_2202.s
05-Aug-98 17:08:18	06-Aug-98 17:08:02	07-Aug-98 17:08:41	86205	23068	98_aug_10/us005-ca1_2204.s
06-Aug-98 17:08:02	07-Aug-98 17:08:41	08-Aug-98 18:08:26	86222	21849	98_aug_10/us005-ca1_2206.s
07-Aug-98 17:08:41	08-Aug-98 18:08:26	09-Aug-98 18:08:08	86260	22670	98_aug_11/us005-ca1_2227.s
08-Aug-98 18:08:26	09-Aug-98 18:08:08		no data collected	21932	
09-Aug-98 18:08:08	10-Aug-98 18:08:31	11-Aug-98 18:08:14	86242	21481	98_aug_13/us005-ca1_2275.s
11-Aug-98 18:08:14	12-Aug-98 18:08:58	13-Aug-98 18:08:38	86254	21365	98_aug_17/us005-ca1_2290.s
12-Aug-98 18:08:58	13-Aug-98 18:08:38	14-Aug-98 19:08:13	86260	21964	98_aug_17/us005-ca1_2298.s
13-Aug-98 18:08:38	14-Aug-98 19:08:13	15-Aug-98 19:08:50	86264	22176	98_aug_17/us005-ca1_2304.s
14-Aug-98 19:08:13	15-Aug-98 19:08:50	16-Aug-98 19:08:10	86255	22304	98_aug-18/us005-ca1_2324.s
15-Aug-98 19:08:50	16-Aug-98 19:08:10	17-Aug-98 19:08:47	86282	22093	98_aug_19/us005-ca1_2336.s
16-Aug-98 19:08:10	17-Aug-98 19:08:47	18-Aug-98 19:08:28	86291	21208	98_aug_20/us005-ca1_2347.s
17-Aug-98 19:08:47	18-Aug-98 19:08:28	19-Aug-98 19:08:09	86298	22314	98_aug_21/us005-ca1_2363.s
18-Aug-98 19:08:28	19-Aug-98 19:08:09	20-Aug-98 20:08:56	86259	22120	98_aug_25/us005-ca1_2372.s
19-Aug-98 19:08:09	20-Aug-98 20:08:56	21-Aug-98 20:08:39	86250	20936	98_aug_25/us005-ca1_2388.s
20-Aug-98 20:08:56	21-Aug-98 20:08:39	22-Aug-98 20:08:16	86265	21373	98_aug_25/us005-ca1_2389.s
21-Aug-98 20:08:39	22-Aug-98 20:08:16	23-Aug-98 20:08:34	86278	22016	98_aug_25/us005-ca1_2403.s
22-Aug-98 20:08:16	23-Aug-98 20:08:34	24-Aug-98 20:08:34	86279	21216	98_aug_26/us005-ca1_2419.s
23-Aug-98 20:08:34	24-Aug-98 20:08:10	25-Aug-98 20:08:52	86309	22055	98_aug_27/us005-ca1_2429.s
24-Aug-98 20:08:10	25-Aug-98 20:08:52	26-Aug-98 21:08:28	86308	21283	98_aug_28/us005-ca1_2439.s
25-Aug-98 20:08:52	26-Aug-98 21:08:28	27-Aug-98 21:08:05	86287	21975	98_aug_31/us005-ca1_2456.s
26-Aug-98 21:08:28	27-Aug-98 21:08:05	28-Aug-98 21:08:44	86290	21902	98_aug_31/us005-ca1_2462.s
27-Aug-98 21:08:05	28-Aug-98 21:08:44	29-Aug-98 21:08:08	86296	21072	98_aug_31/us005-ca1_2467.s
28-Aug-98 21:08:44	29-Aug-98 21:08:08	30-Aug-98 21:08:44	86296	21490	98_sep_01/us005-ca1_2484.s
29-Aug-98 21:08:08	30-Aug-98 21:08:44	31-Aug-98 21:08:23	86297	22171	98_sep_02/us005-ca1_2503.s
30-Aug-98 21:08:44	31-Aug-98 21:08:23	01-Sep-98 22:09:00	86290	21661	98_sep_03/us005-ca1_2525.s

Annex G: Airborne Radionuclide Concentration Annual Graphs

Yearly graphs of radionuclide concentrations in the air

This information was not sampled.

Annex H: Topographic Maps

Topographic maps of the local and southeast region of the United States

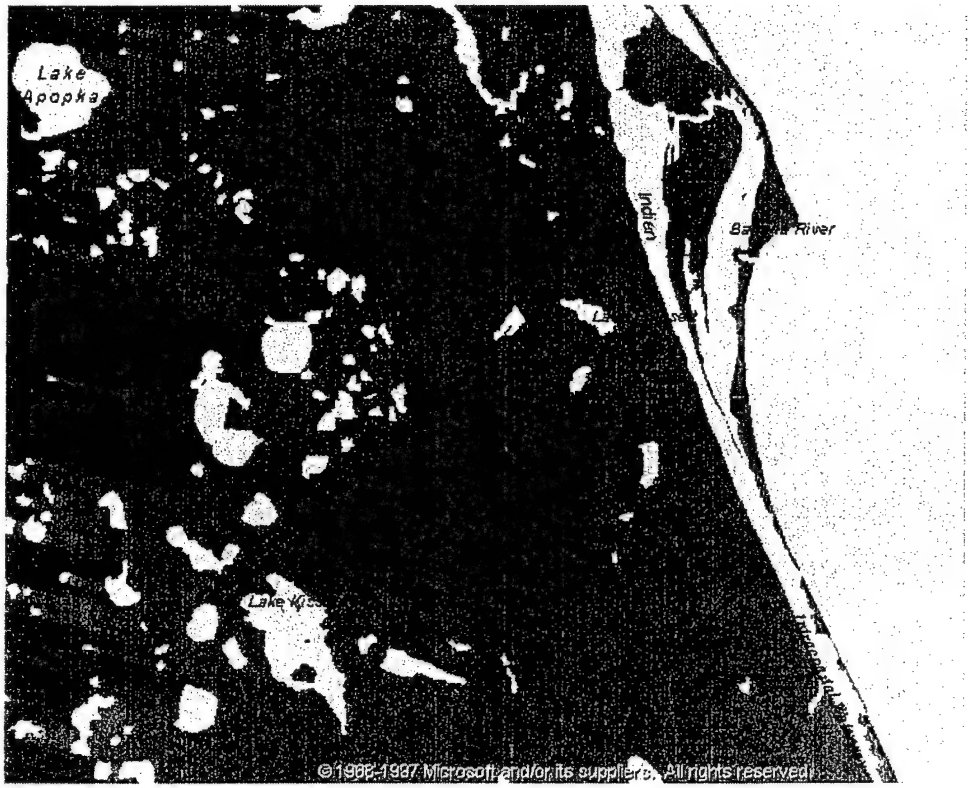


Figure H-1: Local Topography

Annex H Topographic Maps (continued)

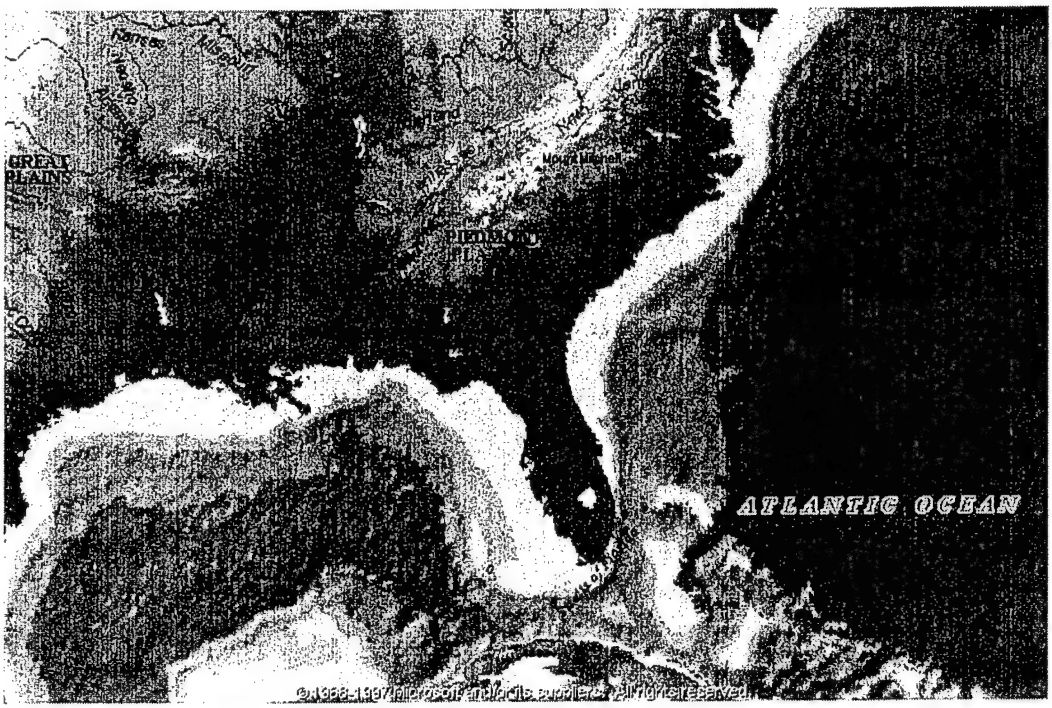


Figure H-2: Topographic Area Map of Southeast United States

Annex I: Tectonic Area Map

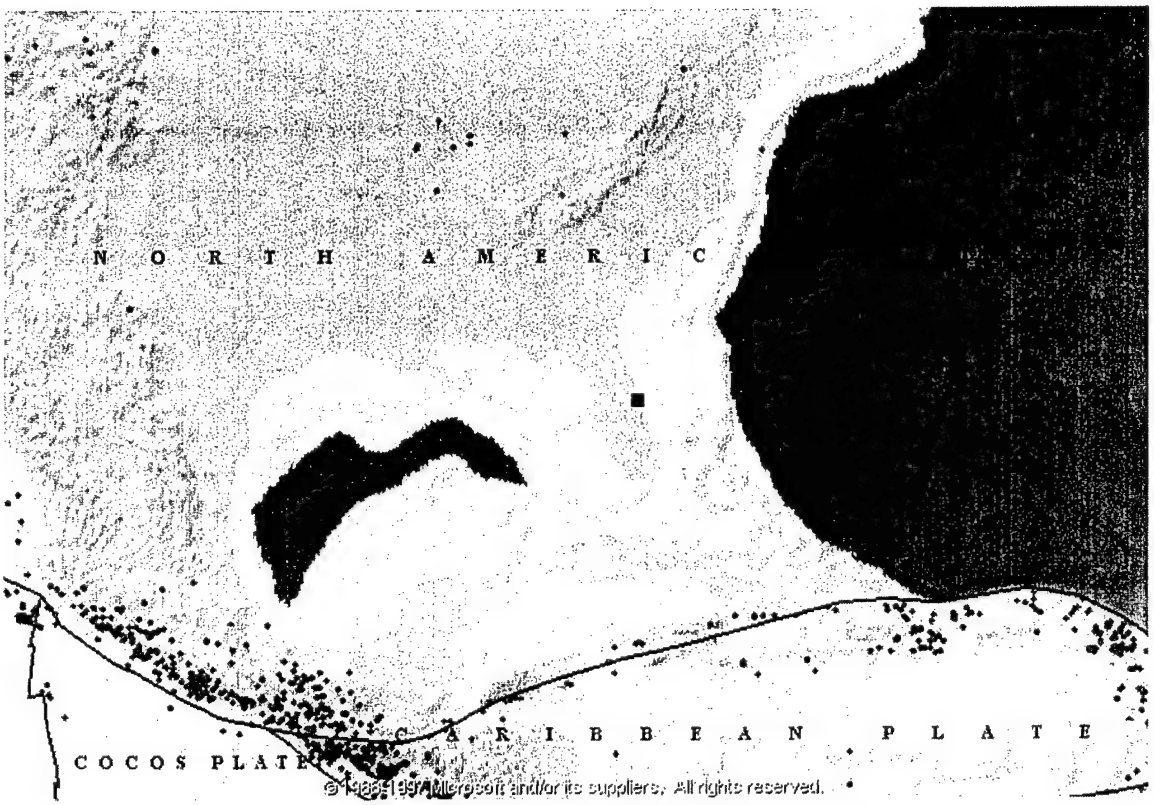


Figure I-1: Tectonic Map of Melbourne, FL, and Southeast United States

Annex J: Hazard Map Of Melbourne, Florida, Region

These maps depict "worst case" hurricane storm surge inundation. The color-coded areas depict landmasses that are flood prone for categories 1, 3 and 5 hurricane conditions. These maps do not include effects of waves, rainfall and flooding from overflowing rivers.

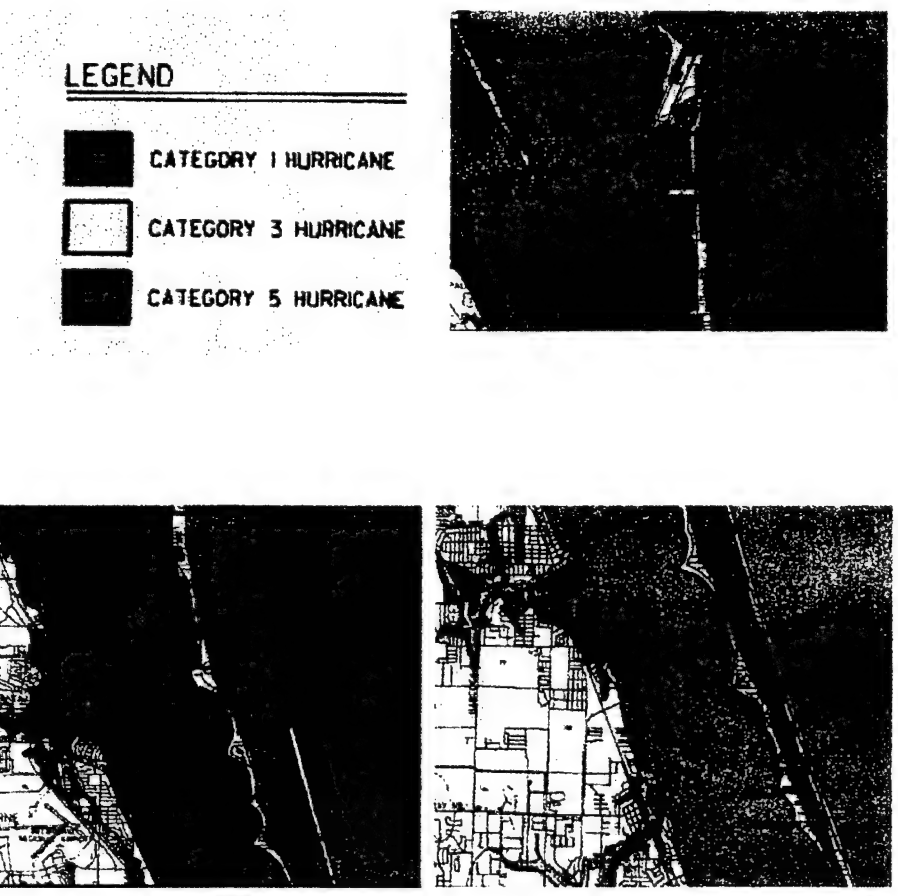


Figure J-1: Hurricane Hazard Map for Melbourne, Florida Region

Annex K: Airborne Gamma Spectrometry Map

This information is not applicable.

Annex L: Equipment Used During Site Survey

List of equipment used (with technical specifications and manufacturer) during the site survey.

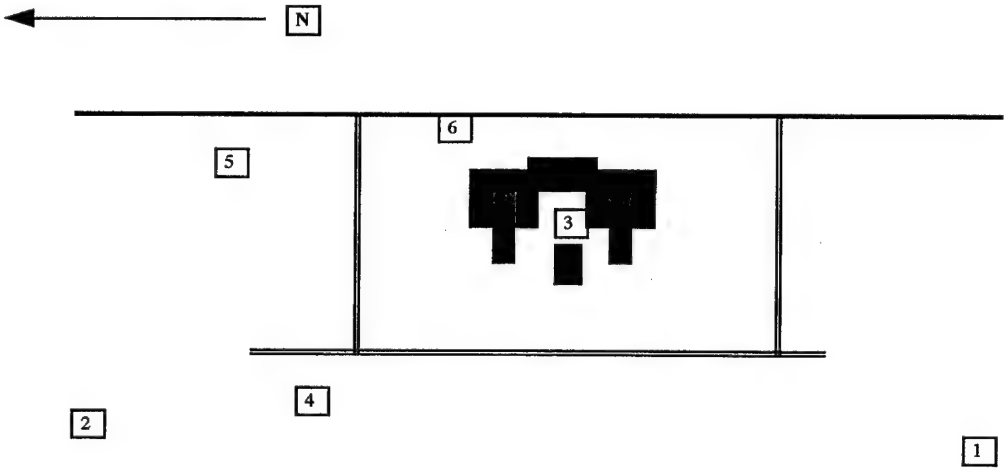
Global Positioning Satellite Receiver

Model: Garmin GPS 12XL
Certificate: FCC ID JPH-17800
Manufacturer: Garmin
Olathe, Kansas, USA

Annex M: Equipment Used for Soil/Rock Samples and Air Sampling

List of equipment used (with technical specifications and manufacturer, where applicable) during the on-site survey for the filter used and the soil/rock samples collected.

Soil/Rock Samples: Four soil samples were collected from within a few hundred yards of the proposed RASA sampler site. Two more samples were collected from 1-3 kilometers upwind from the site. Samples were scooped into plastic vials after loose dust was brushed away from the soil surface. About 25 cm^3 of soil is contained in each vial. A map was sketched of the sample area, with all sampling sites marked (see Figure M-1 below). Labels were applied to each vial corresponding with sites on the sketch. Vials were then placed in a sealable plastic bag and mailed to the laboratory.



1 Control Housing	N 28 13' 21"/W 80 36' 11"
2 Hanger	N 28 14' 31"/W 80 36' 10"
3 AFTAC Bldg. Back	N 28 13' 47"/W 80 36' 43"
4 South Patrick Drive	N 28 13' 53"/W 80 36' 12"
5 AFTAC Bldg North.	N 28 13'59"/W 80 36' 07"
6 AFTAC Bldg. Front	N 28 13' 53"/W 80 36' 09"

Figure M-1: Soil Sample Site Map

Annex M: Equipment Used for Soil/Rock Samples and Air Sampling (continued)

Air Samples: The survey air samples were collected by the Radionuclide Aerosol Sampler/Analyzer (RASA), 12889 Ingenuity Drive, Orlando, Florida 32826.

Annex N: Daily Activity Log

Log of overall daily activities during the site survey.

Sequence of Events:

1-31 August 1998	Air samples collected by RASA.
21-25 September 1998	Soil samples taken and submitted for analysis per 29 April 1998 instructions and kit developed by McClellan Central Laboratory, McClellan AFB, CA.
22 September 1998	DME replaced System Instrumentation Unit and corrected several internal configuration anomalies associated with first production model.
1 September- 30 October 1998	Meteorological and background data collated and compiled.
17 November 1998	Site survey report completed.

Annex O: Personnel List

List of the scientific and/or technical people who participated in the survey process (with phone number, fax and Email).

Installation:

Craig Sloan, Meteorologist, (407) 494-7781

Maurice McKetham, Host Survey Technician (407) 494-3741

John Lucas, Program Manager (407) 494-7594 (Phone)
(407) 494-5460 (Fax)
johnl@aftac.gov (Email)

Distribution List:

OSD/NTP (1)

DTRA/OST (1)

AFTAC/RM (3)

AFTAC/TT (1)

AFTAC/XP (1)

CTI (1)